INTER- AND INTRA INDIVIDUAL VARIATION IN EARPRINTS

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Aan Herman

Aan mijn ouders en grootouders

PREFACE

Fingerprints are well-known as a tool for person identification in forensic investigations. But fingers are not the only parts of the body that may leave characteristic imprints on a crime scene. In 1987, the Dutch police force intended to expand their expertise on body trace evidence. Chief inspector of police Cor van der Lugt of the Police Academy of the Netherlands was asked to summarize from literature the various body traces that may be left by perpetrators of crimes, and investigate their potential for individualization. This is when his interest in earprints started to develop. During the following years, he endeavoured to demonstrate the potential of earprints for forensic research. His efforts to study the value of earprints culminated in 2001 in approved funding from the European Commission for 'FearID', an international research project aimed at the individualization of earprints. In February of 2002, nine institutes from Italy, the Netherlands and the UK – among which the Leiden University Medical Center – joined their research forces to investigate the potential of earprints for forensic investigations. The work presented here was carried out in the context of this research project.

Whether or not earprints may provide a valuable additional tool in forensic research will depend on a number of factors. On the practical side of things, one would not only need an extensive database of earprints, but also a computer programme that can – (semi) automatically and with an acceptable rate of false matching – group earprints that may have been left by a single ear. Developing such a computer programme requires the application of advanced image-processing techniques as well as a suitable set of measurable or classifiable features, and was part of the task the FearID research team had set out to accomplish.

A fundamental aspect of the question whether earprints may be used in forensic investigations – particularly when adduced as evidence in a court of law – is the issue of unicity. May we assume that earprints are uniquely associated with the ear that made them? What are the chances of encountering seemingly indistinguishable prints from different ears? The answers to these questions depend on the available variation in prints of different ears, but also on the differences that may occur between various prints of a single ear.

The work presented here deals with inter- and intra-individual variation in earprints. It

should be emphasized that it is not aimed at offering a comprehensive method for the classification of earprints, although a possible method is discussed in chapter 9. This work was also not intended to offer conclusions regarding the value or reliability of earprints for person identification. It was, however, meant to provide a scientific basis from which to embark upon investigating these matters.

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